CLAIMS

1. A method of manufacturing a ceramic coated fiber, comprising:

heat treating an activated carbon coated fiber containing a ceramic precursor, to form a ceramic coated fiber.

2. The method of claim 1, wherein the heat treating comprises:

a first heating at a temperature of at least 250 °C, to cure the precursor, and

a second heating, in an oxidizing atmosphere, at a temperature of at least 400 °C, to remove the carbon.

3. The method of claim 2, wherein the first heating is in an inert atmosphere.

4. The method of claim 2, wherein the ceramic comprises TiO_2 and/or TiON having an anatase structure.

5. The method of claim 4, wherein the ceramic precursor further comprises a nitrogen or sulfur dopant.

6. The method of claim 5, wherein the nitrogen source is tetramethylammonium hydroxide.

7. The method of claim 2, further comprising:

contacting the ceramic coated fiber with a compound containing silver; and

a third heating of the ceramic coated fiber.

8. The method of claim 2, further comprising:

contacting the ceramic coated fiber with a compound containing palladium;

a third heating of the ceramic coated fiber; and

a fourth heating of the ceramic coated fiber in an atmosphere comprising H_2.

9. The method of claim 2, wherein the ceramic comprises crystalline ceramic and has a BET surface area of at least 50 m^2/g.

10. The method of claim 2, wherein the ceramic comprises at least one member selected from the group consisting of TiO_2, TiON, TiOS, Al_2O_3, ZrO_2, and MgO.

11. A ceramic coated fiber manufactured according to the method of claim 1.

12. A ceramic coated fiber manufactured according to the method of claim 2.

13. A method for producing radical species, comprising illuminating the fiber of claim 12,

wherein the ceramic comprises TiO_2 and/or TiON having an anatase structure.

14. A method for purifying and disinfecting air or water, comprising contacting the air or water with the fiber of claim 12 and illuminating the fiber,

wherein the ceramic comprises TiO_2 and/or TiON having an anatase structure.

15. A photochemical reactor comprising the fiber of claim 12,

wherein the ceramic comprises TiO_2 and/or TiON having an anatase structure.

16. A ceramic coated fiber, comprising:

(a) a fiber, and

(b) ceramic, coated on the fiber,

wherein the ceramic has a BET surface area of at least 60 m^2/g, and

the ceramic comprises crystalline ceramic.

17. The ceramic coated fiber of claim 16, wherein the ceramic comprises TiO_2 and/or TiON having an anatase structure.

18. The ceramic coated fiber of claim 16, wherein the ceramic comprises at least one member selected from the group consisting of TiO_2, TiON, TiOS, Al_2O_3, ZrO_2, and MgO.

19. The ceramic coated fiber of claim 16, wherein the ceramic has a B.E.T. surface area of 60 m^2/g to 300 m^2/g.

20. The ceramic coated fiber of claim 16, wherein the ceramic comprises 10 to 90% by weight of the ceramic coated fibers.

21. The ceramic coated fiber of claim 16, further comprising silver and/or palladium.

22. A method for producing radical species, comprising illuminating the fiber of claim 17.

23. A method for purifying and disinfecting air or water, comprising contacting the air or water with the fiber of claim 17, and illuminating the fiber.

24. A photochemical reactor comprising the fiber of claim 17.

25. A method for manufacturing an intermediate for the fabrication of ceramic coated fibers, comprising heating an activated carbon coated fiber containing a ceramic precursor, to cure the precursor.

26. The method of claim 25, wherein the heating is in an inert atmosphere.

27. An intermediate for the fabrication of ceramic coated fibers manufactured according to the method of claim 25.

28. A ceramic coated fiber, comprising:

(a) a fiber, and

(b) ceramic, coated on the fiber,

wherein the ceramic has a BET surface area of at least 50 m^2/g, and the ceramic comprises at least one member selected from the group consisting of Al_2O_3, ZrO_2, and MgO.

29. The ceramic coated fiber of claim 28, wherein the ceramic has a B.E.T. surface area of 60 m^2/g to 300 m^2/g.

30. The ceramic coated fiber of claim 28, wherein the ceramic comprises 10 to 90% by weight of the ceramic coated fibers.

31. The ceramic coated fiber of claim 28, further comprising silver and/or palladium.